



CLAIMS:

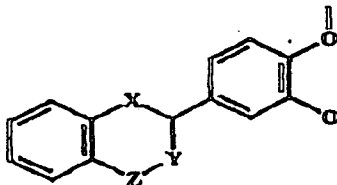
1. A chewing gum having prolonged sensory benefits comprising:

a water insoluble base portion;

a water soluble portion;

a sensorally active component; and

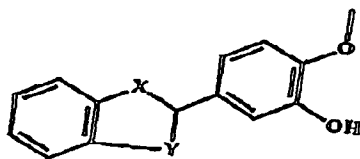
a hydrophobic sweetener having the formula selected from the group consisting of



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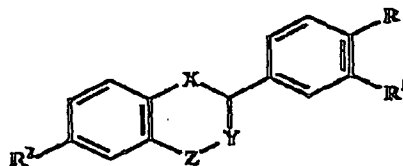
wherein X, Y and Z are selected from the group consisting of CH<sub>2</sub>, O

and S;



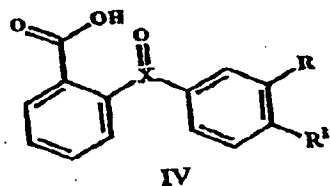
II

wherein X and Y are selected from the group consisting of S and O;

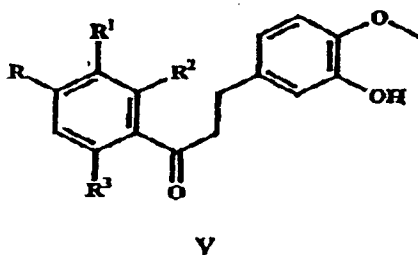


III

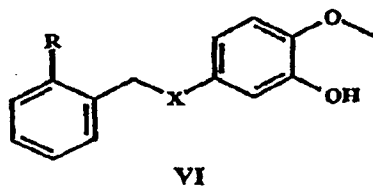
wherein X is S or O; Y is O or CH<sub>2</sub>; Z is CH<sub>2</sub>, SO<sub>2</sub>, or S;  
R is OCH<sub>3</sub>, OH or H; R<sup>1</sup> is SH or OH and R<sup>2</sup> is H or OH;



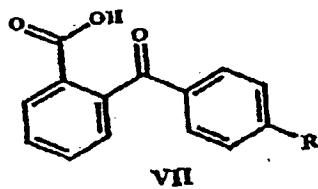
5 wherein X is C or S; R is OH or H and R¹ is OCH₃ or OH;



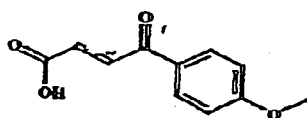
10 wherein R, R² and R³ are OH or H and R¹ is H or COOH;



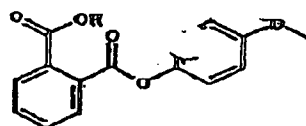
15 wherein X is O or CH₂ and R is COOH or H;



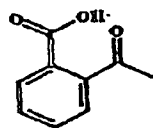
20 wherein R is CH₃, CH₂CH₃, OH, N(CH₃)₂ or Cl; and



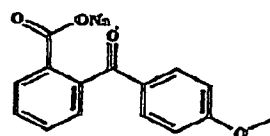
VIII



IX



X



XI

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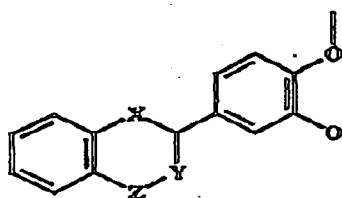
2. The chewing gum of claim 1 wherein the sensory benefits include flavor sensations, tingling, numbing, mouth coating, cooling/warming sensations, pain, itch or combinations thereof.

3. The chewing gum of claim 1 wherein the sensorally active component  
10 is selected from the group consisting of a flavor, a cooling agent, a tingling agent, Jambu extract, Vanillyl alkyl ethers, Vanillyl n-butyl ether, spilanthol, Echinacea extract, Northern Prickly Ash extract, capsaicin, capsicum oleoresin, red pepper oleoresin, black pepper oleoresin, piperine, ginger oleoresin, gingerol, shoagol, cinnamon oleoresin, cassia oleoresin, cinnamic aldehyde, eugenol, cyclic acetal of  
15 vanillin, menthol glycerin ether, unsaturated amides and combinations thereof.

4. The chewing gum of claim 3 wherein the cooling agent is selected from the group consisting of menthol, WS3, N-substituted p-menthane carboxamide, acyclic carboxamides, WS23, menthyl lactate, Takasago Cooling agent, 3-1-menthoxypropane-1,2-diol, menthyl succinate, menthone glyccrol ketals and mixtures  
20 thereof.

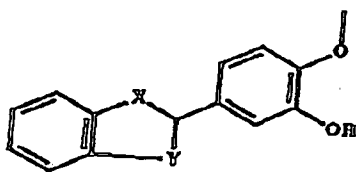
5. The chewing gum of claim 1 wherein the hydrophobic sweetener is in an amount ranging from about 50 Sucrose Equivalents to about 5000 Sucrose Equivalents.

6. A chewing gum having prolonged sensory benefits comprising a water  
25 insoluble base portion; a water soluble portion; a flavor; a plurality of additional sensorally active components; and a hydrophobic sweetener wherein the hydrophobic sweetener has the formula selected from the group consisting of



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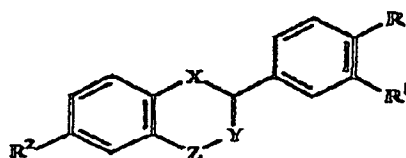
5 wherein X, Y and Z are selected from the group consisting of CH<sub>2</sub>, O and S;



II

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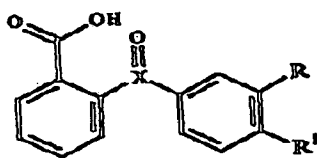
wherein X and Y are selected from the group consisting of S and O;



III

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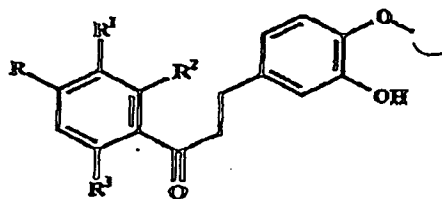
wherein X is S or O; Y is O or CH<sub>2</sub>; Z is CH<sub>2</sub>, SO<sub>2</sub>, or S;  
R is OCH<sub>3</sub>, OH or H; R<sup>1</sup> is SH or OH and R<sup>2</sup> is H or OH;



IV

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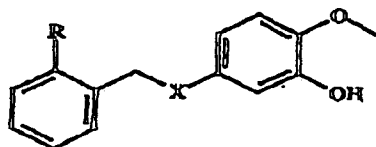
wherein X is C or S; R is OH or H; R<sup>1</sup> is OCH<sub>3</sub>; or OH;



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wherein,  $R$ ,  $R^2$  and  $R^3$  are OH or H and  $R^1$  is H or COOH;

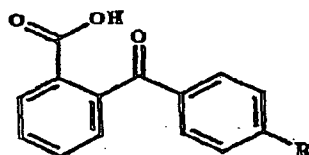
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VI

wherein X is O or  $\text{CH}_2$ ; and R is COOH or H;

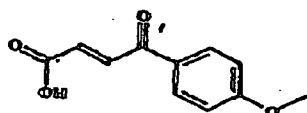
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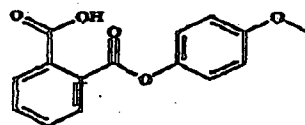
VII

wherein R is  $\text{CH}_3$ ,  $\text{CH}_2\text{CH}_3$ , OH,  $\text{N}(\text{CH}_3)_2$  or Cl; and

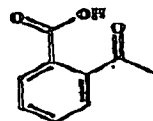
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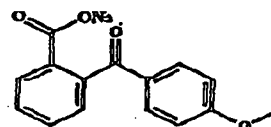
VIII



IX



X



XI

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7. The chewing gum of claim 6 wherein the additional sensorally active components are selected from the group consisting of a cooling agent, menthol, WS3, N-substituted p-menthane carboxamide, acyclic carboxamides, WS23, menthyl lactate, Takasago Cooling agent, 3-1-menthoxypropane-1,2-diol, menthyl succinate, menthone  
5 glycerol ketals, a tingling agent, Jambu extract, Vanillyl alkyl ethers, Vanillyl n-butyl ether, spilanthol, Echinacea extract, Northern Prickly Ash extract, capsaicin, capsicum oleoresin, red pepper oleoresin, black pepper oleoresin, piperine, ginger oleoresin, gingerol, shoagol, cinnamon oleoresin, cassia oleoresin, cinnamic aldehyde, eugenol, cyclic acetal of vanillin, menthol glycerin ether, unsaturated amides and combinations  
10 thereof.

8. A method of producing a chewing gum exhibiting prolonged trigeminal effects comprising the steps of:

providing a plurality of chewing gum ingredients including a water insoluble base portion, a water soluble portion, a trigeminal stimulant and a hydrophobic  
15 sweetener;

processing the ingredients; and

forming the chewing gum.

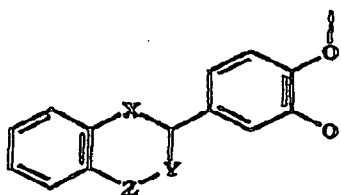
9. The method of claim 8 wherein the hydrophobic sweetener is in an amount ranging from about 50 Sucrose Equivalents to about 5000 Sucrose  
20 Equivalents.

10. The method of claim 8 wherein the ingredients are processed by pre-mixing the hydrophobic sweetener with the trigeminal stimulant.

11. The method of claim 8 wherein the trigeminal stimulant is selected  
25 from the group consisting of a flavor, a cooling agent, menthol, WS3, N-substituted p-menthane carboxamide, acyclic carboxamides, WS23, menthyl lactate, Takasago Cooling agent, 3-1-menthoxypropane-1,2-diol, menthyl succinate, menthone glycerol ketals, a tingling agent, Jambu extract, Vanillyl alkyl ethers, Vanillyl n-butyl ether,

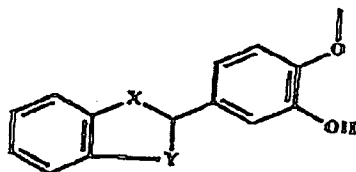
spilanthol, Echinacea extract, Northern Prickly Ash extract, capsaicin, capsicum oleoresin, red pepper oleoresin, black pepper oleoresin, piperine, ginger oleoresin, gingerol, shoagol, cinnamon oleoresin, cassia oleoresin, cinnamic aldehyde, eugenol, cyclic acetal of vanillin, menthol glycerin ether, unsaturated amides and combinations thereof.

12. The method of claim 8 wherein the hydrophobic sweetener has a formula selected from the group consisting of:



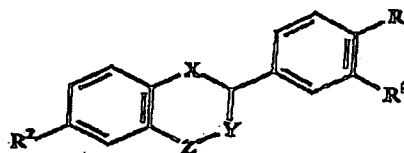
II

wherein X, Y and Z are CH<sub>2</sub>, O or S;



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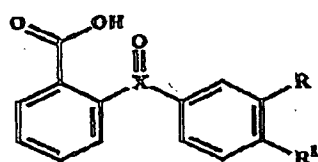
wherein X and Y are S or O;



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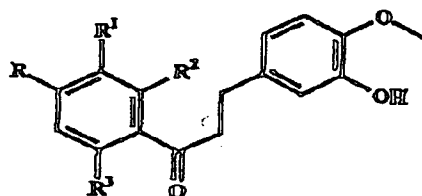
wherein X is S or O; Y is O or CH<sub>2</sub>; Z is CH<sub>2</sub>, SO<sub>2</sub>, or S; R is OCH<sub>3</sub>, OH or H; R<sup>1</sup> is SH or OH and R<sup>2</sup> is H or OH;





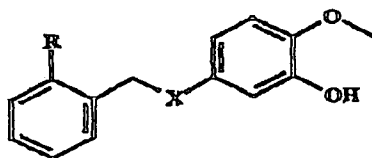
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5 wherein X is C or S; R is OH or H; R¹ is OCH₃; or OH;



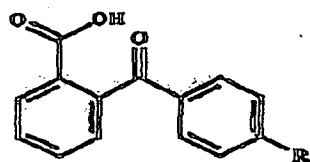
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10 wherein, R, R² and R³ are OH or H and R¹ is H or COOH;



VI

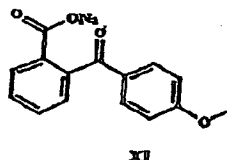
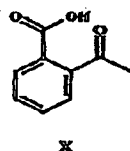
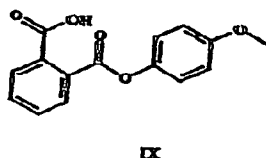
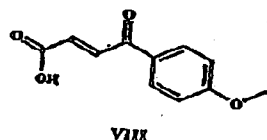
15 wherein X is O or CH₂; and R is COOH or H;



VII

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wherein R is CH₃, CH₂CH₃, OH, N(CH₃)₂ or Cl; and



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13. A method for prolonging sensory benefits of a chewing gum comprising the step of chewing the chewing gum which includes a water insoluble base portion, a water soluble portion, a trigeminal stimulant and a hydrophobic  
10 sweetener including a sweet organic compound.

14. The method of claim 13 wherein the trigeminal stimulant is selected from the group consisting of a flavor, a cooling agent, menthol, WS3, N-substituted p-menthane carboxamide, acyclic carboxamides, WS23, menthyl lactate, Takasago  
15 Cooling agent, 3-1-menthoxypropane-1,2-diol, menthyl succinate, menthone glycerol ketals, a tingling agent, Jambu extract, Vanillyl alkyl ethers, Vanillyl n-butyl ether, spilanthal, Echinacea extract, Northern Prickly Ash extract, capsaicin, capsicum oleoresin; red pepper oleoresin, black pepper oleoresin, piperine, ginger oleoresin, gingerol, shoagol, cinnamon oleoresin, cassia oleoresin, cinnamic aldehyde, eugenol,  
20 cyclic acetal of vanillin, menthol glycerin ether, unsaturated amides and combinations thereof.

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## INTERNATIONAL SEARCH REPORT

 International application No.  
 PCT/US02/13862

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(7) : A 23 G 3/30 US CL : 426/3 According to International Patent Classification (IPC) or to both national classification and IPC						
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : 426/3 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NONE						
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>						
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.				
X — Y	US 4,013,801 A (DAWSON et al) 22 March 1977 (22.03.77), see entire document.	1-3, 8, 10-14 — 4-7, 9				
X — Y	US 3,857,962 A (WESTALL et al) 31 December 1974 (31.12.74), see entire document.	1-3, 8, 10-14 — 4-7, 9				
X — Y	US 3,821,417 A (WESTALL et al) 28 June 1974 (28.06.74), see entire document.	1-3, 8, 10-14 — 4-7, 9				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.						
<table border="0"> <tr> <td colspan="2">           * Special categories of cited documents:            "A" document defining the general state of the art which is not considered to be of particular relevance            "E" earlier document published on or after the international filing date            "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)            "O" document referring to an oral disclosure, use, exhibition or other means            "P" document published prior to the international filing date but later than the priority date claimed         </td> <td colspan="2">           "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention            "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone            "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art            "G" document member of the same patent family         </td> </tr> </table>			* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "G" document member of the same patent family	
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Date of the actual completion of the international search 16 AUGUST 2002		Date of mailing of the international search report 17 SEP 2002				
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3250		Authorized officer ARTHUR L. CORBIN Telephone No. (703) 308-0661 Jean Pr... Parale...				

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US02/13862

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 5,236,721 A (CHU et al) 17 August 1993 (17.08.93), see entire document.	8, 10, 11, 13, 14 ----- 9